UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,510	12/15/2000	Junius A. Kim	GA-8380	9551

26294 7590 03/28/2007

TAROLLI, SUNDHEIM, COVELL & TUMMINO L.L.P.
1300 EAST NINTH STREET, SUITE 1700
CLEVEVLAND, OH 44114

EXAMINER	
SEFCHECK, GREGORY B	
ART UNIT	PAPER NUMBER
2616	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/737,510	KIM ET AL.	
	Examiner	Art Unit	
	Gregory B. Sefcheck	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

- Applicant's Request for Continued Examination filed 12/21/2006 is acknowledged.
- Claims 1-21 have been cancelled.
- Claims 22-41 have been added and remain pending.

Claim Objections

1. Claim 22, 23, 33, and 35 are objected to because of the following informalities:

- Regarding Claim 22, line 9 of claim 22 recites "fixed-length, recurrent time-slot in each frame". However, the claim does not provide antecedent basis for "each frame" in the claim. The claim should be amended to explicitly state that the TDM signal comprises one or more frames. Claim 22 also refers to both a "local processor" and "local control processor". Are these referring to the same processor? If so, reference in the claim should be consistent. This may apply to other pending claims as well, where "local control processor" or "local processor" is recited.

- Regarding Claim 23 and 35, claim 35 is identical to claim 23, both of which are dependent from claim 22.

- Regarding Claim 33, there is insufficient antecedent basis for "control data octets" in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 22, 24, 34, 36, 38, and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Doucette et al. (US006108346A), hereafter Doucette.

- Regarding Claims 22, 24, 34, 36, 38, and 39,

Doucette discloses a system and method of distributing control data through transmitting and receiving TDM data (Figs. 1 and 3; Col. 2, lines 58-64; Col. 5, lines 16-36; meeting claim 22,36 – system for communicating TDM control data in a TDM network).

Referring to Fig. 1, Doucette shows one module 10a on the ring network contains the master control 120 for the other slave modules 10 (Col. 6, lines 39-42; meeting claim 22,36 – master control for providing TDM control data; claim 34 – first TDM mux acts as master; claim 34 – one slave mux transmits at a given time, when stimulated by master mux).

Each module includes an output port 14 for accepting control/token characters received at the input port 16 from the master source 120 and inserting the control data

into its subsequent transmission (Col. 6-8, lines 60-35; meeting claim 22,36 – slave mux comprising a transmitter for accepting and inserting TDM control data into at least a portion of one of the channels/time slots of the TDM signal/frame).

Each module 10 is equipped to receive control data from the master source that is extracted and passed to its local processor for use in sending its packets in turn (Col. 3, lines 40-42; Col. 4, lines 20-25; Col. 6, lines 56-59; meeting claim 22,36 – slave mux comprising receiver for extracting TDM control data and passing it to a local processor).

Each module 10 is further equipped to immediately pass certain control characters along to the next module without local processing (Col. 6, lines 53-56; meeting claim 22,39 – slave mux comprising a bridging component for relaying TDM control independently of a local control processor associated with the TDM multiplexer).

Doucette shows that the data is communicated from module to module in time frames of a fixed-length, recurring for each module in the network (Fig. 3; Col. 5, lines 8-20; meeting claim 22,38 – at least one slave TDM mux to produce TDM signal comprising plurality of fixed-length, recurrent time slots in each frame allocated to respective channels associated with the TDM mux)

Doucette shows that the control data includes indications of which module is permitted to transmit (configuration data) and what type of data is to be transmitted (status information) during a given period of the fixed-length frame (Col. 3, lines 6-15; meeting claim 24,36 – TDM control data comprising configuration data for a mux or status information of the network).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucette.

- Regarding Claims 27 and 28,

Doucette discloses a system and method of distributing control data through transmitting and receiving TDM data that covers all limitations of the parent claims.

Doucette does not explicitly show the transmitter inserting the control data in a fraction of a time slot or two time slots, or that the receiver extracting the control data from the corresponding time slot(s).

Utilizing bandwidth efficiently is a common goal for data transmission. Control data, though necessary, utilizes bandwidth that could otherwise be used for payload data. If the needed control data is smaller in size than that of a time slot, it would be beneficial to only utilize the needed fraction of that time slot for carrying the control data, thereby freeing up the remaining fraction of that time slot for carrying payload data (meeting claim 27 – transmitter inserts TDM control data into a fraction of the time slots and the receiver extracts the data from the corresponding time slot fraction; claim 28 –

transmitter inserts the TDM control data into at least two time slots and the receiver extracts the data from the corresponding time slots).

It would have been obvious to one of ordinary skill in the art at the time of the invention to insert the control data into a fraction of a time slot or multiple time slots, as required by the size of the control data to be inserted, with the receiver extracting the control data from the corresponding time slots. This would allow the bandwidth occupied by control data to be dynamically allocated based upon the size of the control data, such that the remainder of the time slots can carry payload data, thereby maximizing the amount of data that can be carried in a single frame and increasing system bandwidth.

6. Claims 23, 29-31, 35, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucette in view of Goodman et al. (US006636529B1), hereafter Goodman.

- Regarding Claims 23, 29, 31, 35, and 37,

Doucette discloses a system and method of distributing control data through transmitting and receiving TDM data (Figs. 1 and 3; Col. 2, lines 58-64; Col. 5, lines 16-36; meeting claim 29 – system for communicating TDM control data in a TDM network).

Referring to Fig. 1, Doucette shows one module 10a on the ring network contains the master control 120 for the other slave modules 10 (Col. 6, lines 39-42; meeting claim 29 – master control for providing TDM control data).

Each module includes an output port 14 for accepting control/token characters received at the input port 16 from the master source 120 and inserting the control data into its subsequent transmission (Col. 6-8, lines 60-35; meeting claim 29 – slave mux comprising a transmitter for accepting and inserting TDM control data into at least a portion of one of the channels/time slots of the TDM signal/frame).

Each module 10 is equipped to receive control data from the master source that is passed to its local processor for use in sending its packets in turn (Col. 3, lines 40-42; Col. 4, lines 20-25; Col. 6, lines 56-59; meeting claim 29 – slave mux comprising receiver for extracting TDM control data and passing it to a local processor).

Each module 10 is further equipped to immediately pass certain control characters along to the next module without local processing (Col. 6, lines 53-56; meeting claim 29 – slave mux comprising a bridging component for relaying TDM control independently of a local control processor associated with the TDM multiplexer).

Doucette shows that the data is communicated from module to module in time frames of a fixed-length, recurring for each module in the network (Fig. 3; Col. 5, lines 8-20; meeting claim 29,31 – at least one slave TDM mux to produce TDM signal comprising plurality of fixed-length, recurrent time slots in each frame allocated to respective channels associated with the TDM mux)

Doucette does not explicitly disclose FIFOs for buffering control data upon reception and before transmission such that relay of the data across the mux can be done without synchronization by the local processor. Doucette also does not explicitly

disclose buffering control data received at a first rate and transmitting the control data at a different, second rate.

Goodman discloses synchronous transmission of virtual containers that enable the mapping of one rate into another (meeting claim 37 – buffering TDM control data upon reception at a first data rate; claim 37 – transmitting at a second rate different from the first data rate). Referring to Figs. 3-5, Goodman also shows data received is provided to FIFO 490 and FIFO 560 (one for each direction of communication) when relayed through multiplexor 310 (Col. 10, lines 1-55; meeting claim 23,29,35 – bridging component comprising a first FIFO to buffer incoming TDM control data and a second FIFO to buffer outgoing TDM control data such that relay across the slave mux can be done without sync by local control processor).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system and method of Doucette by enabling the mapping of one rate into a different, second rate by using FIFOs, as shown by Goodman, such that data can be relayed independent of the contents of the packet and independent of layer 2 or 3 processing.

- Regarding Claims 30,

Doucette discloses a system and method of distributing control data through transmitting and receiving TDM data that covers all limitations of the parent claims.

Doucette shows that the control data includes indications of which module is permitted to transmit (configuration data) and what type of data is to be transmitted

(status information) during a given period of the fixed-length frame (Col. 3, lines 6-15; meeting claim 30 – TDM control data comprising configuration data for a mux or status information of the network).

7. Claims 25, 26, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucette in view of Eidson (US006370159B1).

- In regards to Claims 25, 26, 40, and 41,

Doucette discloses a system of distributing control data through transmitting and receiving TDM data that covers all limitations of the parent claim.

Doucette does not explicitly show the network coupled to a secondary network to through an RS-232. Doucette also does not show communicating with the master source through RS-485.

Eidson discloses a system of distributing time reference from a master node to a plurality of slave nodes. Referring to Fig. 4, Eidson shows that the master/slave network may be coupled to secondary networks 60-62. In Fig. 7, Eidson further shows that the connections between the master, slaves, and secondary networks may be Ethernet or RS232 links, or any other such industry standard-type link (claim 25 – second network comprising plurality of muxes; claim 25,40 – slave mux in first network extracts TDM data from TDM signal, transmits the control data to another slave mux in the first network as part of a TDM signal and transmits the control data to a mux in the

second network via a secondary link to create a subnetwork; claim 26 – secondary link comprises RS-232; claim 41 – communicating with master control source via RS-485).

It would have been obvious to one of ordinary skill in the art at the time of the invention to communicate between multiplexers, including those coupled to the network through a secondary network via a secondary link, using links such as RS-232 and RS-485, or other such standard-type connection, as taught by Eidson. This would enable distribution of control data from the primary network to secondary network, thereby enabling synchronization between the linked networks over such interoperable links.

8. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucette in view of Goodman, as applied to claim 29 above, and further in view of Lang et al. (US006188699B1), hereafter Lang.

- In regards to Claims 32 and 33,

Doucette discloses a system of distributing control data through transmitting and receiving TDM data that covers all limitations of the parent claim.

Doucette does not explicitly show the receiver perform a serial/parallel conversion of the control data, bit shift the control data to form one or more control data octets and buffers the control data octets for use by the control processor. Doucette also does not show the transmitter buffer control data octets from the master source, perform a parallel/serial conversion of the control data, and insert the control data into predetermined data positions of the TDM signal.

Lang shows a multiplex system receives and transmits data multiplexed with control data. Referring to Figs. 6, Lang shows that data is serial-to-parallel converted at the receiver and buffered before octets of control data are passed to Control Logic for processing. Similarly, referring to Fig. 34, Lang shows that control data is buffered and parallel-to-serial converted before being inserted into the multiplexed transmission (Fig. 1; Col. 12, lines 27-50; Col. 28, lines 11-45; claim 32 – receiver performs a serial to parallel conversion of the TDM control data, bit shift the control data as to form at least one control data octet, and provide the octet to a buffer; claim 33 – transmitter buffers octets, performs parallel to serial conversion and inserts the data into predetermined positions within the TDM signal).

It would have been obvious to one of ordinary skill in the art at the time of the invention to handle control data in the system of Doucette by passing control data from receiver to transmitter by converting the serial control data to parallel and buffering the control data octets at the receiver, passing the control to the processor, and then buffering the parallel control data octets and converting to serial for inserting into the multiplexed transmission stream, as taught by Lang. This modification would enable the processing of data in a well-known manner at each node and ensure efficient performance of the multiplexing operation.

Response to Arguments

9. Applicant's arguments filed 12/21/2006 have been fully considered but they are not persuasive.

- In the Remarks on pg. 12 of the Amendment, Applicant contends that Doucette does not teach or suggest carrying control data in an information channel in a TDM system.
- The Examiner respectfully disagrees. As shown in the rejections above, Doucette clearly discloses the communication of control data between modules in a network. As shown by Fig. 3 of Doucette, data to be communicated is placed into fixed-length time frame windows, where the windows are time-division multiplexed, thereby meeting the claim limitation of TDM communication in a TDM network.

- In the Remarks on pg. 12-13 of the Amendment, Applicant contends that Doucette does not teach the use of fixed, recurring time slots representing a plurality of data channels. Applicant admits that Doucette teaches fixed-length windows for transmission, but alleges that the variable data types within those fixed-length windows prevent Doucette from meeting the claim limitations.
- The Examiner respectfully disagrees. The disclosure of Doucette regarding the variable nature of data type transmitted within each fixed-

length window "frame" is irrelevant to the pending claims. Doucette shows that each window is a fixed-length and that data transmitted within those windows are allocated to respective channels associated with the TDM multiplexer (synchronous and asynchronous data from the modules 10), thereby meeting the claim limitations.

- In the Remarks on pg. 14 of the Amendment, Applicant contends that there is no teaching or suggestion of relaying data independently of the local processor of a slave multiplexer in Doucette, as presently claimed.
- The Examiner respectfully disagrees. As clearly shown in the rejection above and disclosed by Doucette on lines 49-60 of Col. 6, modules (multiplexers) detect the receipt of control data through the use of data decodes. Based upon the type of control data received/decoded, the module will hold the data until its ready to retransmit (further processing of control data), or the control data may be immediately retransmitted (relayed independently of local processor). Based upon this disclosure of Doucette, the contested claim limitations are met.

- In the Remarks on pg. 15 of the Amendment, Applicant contends that Doucette does not disclose inserting configuration data and status information into a TDM signal.

- The Examiner respectfully disagrees. "Configuration data and status information" is a broad limitation that is met by the disclosure of Doucette, which shows the insertion of control data that provides an indication of which module is permitted to transmit (configuration data) and what type of data is to be transmitted (status information) during a given period of the fixed-length frame.

NOTE: It is the opinion of the Examiner that Applicant is reading limitations from the specification into the claim language of the present application. Examiner admits that there are significant differences between the method and system disclosed by Doucette and the method and system disclosed by Applicant. However, the pending claims have been drafted broadly as to allow other reasonable interpretations with respect to the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory B. Sefcheck whose telephone number is 571-272-3098. The examiner can normally be reached on Monday-Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GBS GBS
3-21-2007

Seema S. Rao 3/20/07
SEEMA S. RAO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600